

# **LEE COUNTY ARTIFICIAL REEF PLAN**



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# **LEE COUNTY ARTIFICIAL REEF PLAN**

## **1. INTRODUCTION**

A. Marine Habitats of Lee County

## **2. ARTIFICIAL REEF OBJECTIVES**

A. Overview

B. Objectives

C. Attraction vs. Production

## **3. ECONOMIC ASPECTS OF ARTIFICIAL REEFS**

A. Lee County Commercial Landings

## **4. ARTIFICIAL REEF PLANNING**

A. Reef Zone Map

B. Advisory Committees, ARAC and WAC

C. Permits

D. Materials, Type, and Deposition Procedure

E. Project Frequency

F. Grant Funded Projects

## **5. ARTIFICIAL REEF MATERIALS**

A. Material Criteria

B. Bio-fouling Potential of Material Types

C. Prioritization of Materials

## **6. SITE SELECTION CRITERIA**

A. Site Selection Flowchart

B. Selection Procedure

## **7. ARTIFICIAL REEF MANAGEMENT**

A. Maintenance

B. Monitoring

C. Education

## **8. PROJECT IMPLEMENTATION AND MANAGEMENT**

A. Material Acquisition

B. Site Selection

C. Funding

D. Solicitation of Bids for Construction of Artificial Reef

E. Reef Construction

F. Contract Close-out/Site Inspection

## **9. PLAN GOALS**

**APPENDIX A - Glossary**

**APPENDIX B - Zone Map**

**APPENDIX C - Material Placement Checklist**

**APPENDIX D - Reef Survey Form**

**TABLE 1 - Reef Site/Zone Summary**

**TABLE 2 - Historical Reef Deposition**

**FIGURE 1 - Site Selection Flowchart**

# LEE COUNTY ARTIFICIAL REEF PLAN

## 1. INTRODUCTION

The earliest documented cases of organized reef construction in Lee County are from the late 1960's. Recreational anglers who were interested in improving their fishing success pooled their resources through the formation of clubs. These clubs built reefs primarily out of the least expensive materials available, and placed them in locations with the most convenient access. Commonly used materials included tires, car and truck bodies, construction debris, and appliances. Some of these quickly proved to be short lived in the marine environment. The location of these materials at convenient sites generally meant that they were in relatively shallow water. This compounded early reef building problems as wave energy pounded the materials, often causing them to shift or break apart. Some near shore sites were also problematic because of the high load of suspended solids. These solids limited the growth of organisms on the reef. They also made the reefs susceptible to periodic siltation, where they may have been buried for months at a time. By the 1970's, reef building organizations had learned from their mistakes and were pursuing better materials and sites. The locations of the sites, however, were often closely guarded secrets among the reef builders. The inherent error of marine navigational equipment also meant that materials were not always placed exactly where the builders had intended. When marker buoys were installed, natural forces and vandalism limited their life span.

By the mid 1980's, Lee County government had become more involved in local reef building efforts through their Sea Grant Extension Agent. Improvements were made in site and material selection criteria, permitting and compliance, and transfer of reef information to the general public.

The history of reef development in Lee County continues to go through an evolutionary process. Southwest Florida has the highest per capita boat ownership in the United States. Lee County also ranks consistently in the top five Florida counties in terms of saltwater fishing license revenues. We are still blessed with abundant and productive inshore and nursery habitats, but the demands and pressures on fisheries resources grow daily. Accordingly, with direction in the Lee County Comprehensive Growth Management Plan, new stricter permitting criteria, assistance from the Florida Fish and Wildlife Conservation Commission (FFWCC, A list of acronyms and definitions is contained in Appendix A), and partnerships with private organizations, new reefs continue to be developed.

Lee County reef building today is an effort to meet the growing demand for recreational fishing opportunities in an environmentally compatible fashion. As detailed in this plan, reefs are built to provide opportunity for fish as well as anglers. Reef sites and materials are chosen systematically and in consult with the local fishing and environmental communities. Projects are carefully planned and built in coordination with permitting agencies and FFWCC. Existing and new projects are systematically being tracked and evaluated. A multifaceted approach to public outreach ensures that anglers will know about the reef projects and how to use them responsibly. Reef building in Lee County will certainly continue to change. This plan will provide a tool to guide present development and maximize future success.

### A. The Marine Habitats of Lee County

Lee County is blessed with an extensive inshore and offshore marine ecosystem. Its subtropical climate affords a diverse compilation of aquatic specimens. Coastal barrier islands provide the nutrients, refuge and foundation for the shallow seagrass meadows that carpet the many bays, estuaries and lagoons. In Lee County alone, major aquatic ecosystems such as Charlotte Harbor, Pine Island Sound and Estero Bay provide the means to mix the freshwater upland runoff with the tidal saltwater of the Gulf of Mexico. Numerous mangrove islands and marshes promote sedimentation by trapping fine particles. This relatively shallow estuarine system drains over

3000 square miles of watershed and encompasses over 53 square miles of surface water. Approximately 30% of the inshore waters contain seagrass meadows.

This system is inhabited by approximately 246 species of fish. Many of these species are important forage for other species. These include species important to the commercial and sportfishing industries. Many of these fish species utilize both the inshore habitat afforded by the estuarine system and the open waters of the Gulf during their life cycle. The adult spawning stock living in the Gulf reproduce, broadcasting ichthyoplankton, which migrate by way of tidal surges into the upper reaches of the estuarine system. Specific species have specific criteria, such as shoreline features, seagrass meadows, salinity and tidal energy, for juvenile habitat.

Offshore habitat includes hard substrate and shifting sandy and/or shell bottom. Areas with limestone outcropping provide the substrate for soft and hard corals, encrusting invertebrates and algae. The vast majority of Lee County's offshore waters are absent of ledges and hard bottom outcroppings. Many reef fish species require some variety of structure to their offshore surroundings to thrive as adults. Consequently, for there to be a healthy, diverse reef fish assemblage, attention must be given to both the inshore and offshore components of their life cycle.

## **2. ARTIFICIAL REEF OBJECTIVES**

### **A. Overview**

Lee County has a network of 21 artificial reef sites, which are either permitted or have held permits since the 1980's. In addition, there are many artificial reefs that have been placed without the proper permits by well meaning, but unauthorized individuals. Materials on these reefs portray the history of reef building in Florida. These materials include, but are not limited to, concrete culverts, school buses, steel hulled and wooden ships, railroad hopper cars, barges, bridge rubble, tires and cement mixer drums. Permitted artificial reefs have been placed in the inshore waters of Charlotte Harbor, and as far out as 30 miles offshore. With the majority of the bottom composed of relatively barren sand, the addition of properly constructed artificial reefs can positively impact the inshore, nearshore and offshore populations of a variety of reef fish. These reefs can provide safe haven, as well as forage area, for a variety of reef fishes. The science of artificial reef construction has progressed in recent years and it has become increasingly important to clearly define the reasons behind building an artificial reef. Lee County has a variety of objectives for constructing reefs. The desired outcome of all objectives is to enhance the standing stock of many different species of reef fish, while improving the quality of life for the citizens of Lee County in the process.

### **B. Reef Objectives**

#### **1. Fishery Enhancement**

The enhancement of a fishery could take several different courses. One course could be the production of a single target species. Another could target an entire guild of fish species. The production of a primary food source (baitfish) for targeted species could also be a sought-after goal. The creation of a reef that may be difficult to locate or whose coordinates are not released to the public may allow that reef to increase a fishery stock without the substantial take of targeted fishing pressure. In turn, fish that grow on this reef would presumably move to other sites as the reef reached its carrying capacity.

The reef would need to address certain limiting factors such as shelter, primary food production, etc., specific for the targeted fishery.

## 2. Habitat Enhancement

Habitat enhancement focuses on designing a reef that would create an environment suitable for a wide variety of fish and benthic invertebrates to live out their lives. It would need to address aspects of the animals' life cycles that have an offshore component. It would also need to provide adequate protection against predation, human or otherwise. The reef should attempt to complement or improve upon the natural habitat of local waters, i.e. live bottom and ledge areas.

## 3. Diving Attraction

Artificial reefs provide interesting SCUBA diving locations in and of themselves. However, there are certain types of material that can provide a unique diving experience. Large, steel-hulled ships are of great interest to many SCUBA divers and the addition of a few large vessels in Lee County waters would enhance the diving experience for local divers. There may be certain species of fish, such as goliath grouper, common to this area that could provide a diving attraction. Reefs could be built specifically to provide habitat for these species.

## 4. Scientific Study

There are many unanswered questions regarding artificial reefs and their role in the marine environment. Deploying reefs to provide a study area for scientists to answer these questions would aid the future of reef building.

## 5. Material Diversity

Most Lee County reef sites have a variety of reef materials within their boundaries. Lee County wants all active sites to have the highest degree of variability in material types. This provides the best comparison data for staff to judge the relative productivity of material types and provides a variety of fish habitats.

## 6. Mitigation

Occasionally, county projects, such as beach renourishment, may impact near-shore habitat. Lee County always attempts to minimize impacts to natural habitat in any coastal project. The proper construction of an artificial reef may offset, or mitigate unavoidable impacts by creating new habitat close to the impacted areas.

### C. Attraction vs. Production

There has always been a debate on whether or not artificial reefs provide a site which attracts large numbers of fish from natural areas, exposing them to greater fishing pressures, or if the reef actually creates additional habitat, thereby directly or indirectly increasing the populations of reef fish.

Large aggregations of fish can provide an easy target for fishermen. However, these aggregations would be present at either natural or man made habitat. The ramifications of the human impacts on reef fish populations that surround artificial reefs, as well as natural reefs, are not clearly understood.

Along the Lee County coastline, it can be argued that the quantity of natural live bottom areas that provide a home for reef fish is the limiting factor in the "reef fish reproduction" reaction. There is little live bottom available when compared to large expanses of relatively "unproductive" sand bottom. With the proper construction of an artificial reef, creating viable long-term habitat, the limiting factor of the "reef fish reproduction" reaction is increased, positively impacting the populations of local reef fish.

Also, the addition of artificial reefs may actually reduce fishing pressure on both natural and artificial sites by simply providing an additional location for fishermen to access. This dilution of fishing pressure is becoming an increasingly important consideration as fishing pressure in SW Florida continues to grow. If there were little or no artificial reefs locally, then, in all likelihood, the few existing natural hard bottom or ledge habitats would be bearing the full brunt of that increased fishing pressure.

Both sides of the issue will continue to be debated as the body of scientific data improves. Recent research in the Gulf of Mexico has indicated that properly constructed reefs do produce certain species of reef fish. The studies, however, also indicate that directed fishing pressure could contribute to reduced net productivity by out-harvesting the reef's ability to produce fish. Unknowns, such as environmental conditions, complete species life history requirements, and the human interaction factor should all be addressed in the near future by the scientific community. Lee County will update their reef policies and procedures, as new information becomes available.

### **3. ECONOMIC ASPECTS OF ARTIFICIAL REEFS**

#### Lee County Commercial Landings

Lee County coastal waters are home port to many commercial fishermen, fishing a wide array of gear for many economically important species. Matanzas Harbor is home to one of the largest shrimp fishing fleets in Florida. Large amounts of finfish and crabs are also landed in Lee County.

Currently, a detailed analysis of the economic benefits of Lee County's artificial reefs is being undertaken. This analysis has a large scope that encompasses many counties along the southwest Florida coast. The analysis will be complete in late 2008. Factors to consider are quite diverse. They may include items such as boat sales, fuel sales, marine electronic sales, boat repairs, bait and tackle sales, food, drink, ice, Dramamine, suntan lotion, charter fishing trips, and recreational and commercial seafood harvesting. Recreational SCUBA diving should also be considered when discussing local and regional economic impacts. All of the above and more have a direct or indirect impact on the economy of Lee County.

### **4. ARTIFICIAL REEF PLANNING**

#### A. Reef Zone Map

One of the primary tools in artificial reef planning will be the Lee County reef zone map (Appendix B). The zone map will be used in conjunction with the site selection flow chart (Figure 1, Sect. 6A) to determine if new reef sites are appropriate. Sites and specific material placements will be designed to minimize the potential for known user conflicts.

#### B. Advisory Committees, ARAC and WAC

A key in reef planning will be consultation with standing advisory committees to County staff and Commissioners. The ARAC are advisors to County staff in the areas of project prioritization, design, site selection, implementation, private funding, and public relations. The ARAC membership represents each of the following interests: environmental protection, sport fishing, charter fishing, commercial fishing and recreational diving. The WAC are advisors to staff in the areas of project prioritization and public funding. The WAC is composed of seven members, knowledgeable in boating issues, appointed by the BOCC. A project shall not proceed if the WAC or ARAC files an objection. The ARAC shall be asked for comments on the Reef Development Plan annually.

### C. Permits

No reef shall be built without all applicable local, state and federal permits. In general, reef sites shall be permitted and developed so as to be in compliance with ACOE Standard General or Individual Permits, and FDEP Noticed General Permit for artificial reefs (section 62-341.600, F.A.C.), if applicable. If particular circumstances, such as depth or material type, preclude use of the general permit, then permitting shall be through a joint application for an environmental resource permit (ERP). For permits outside the jurisdiction of the State, a copy of all permits shall be supplied to FFWCC as the central repository of artificial reef information for this region. Permitting procedures will be updated or modified as dictated by changes in the regulatory process.

### D. Materials, Type and Deposition Procedure

All permit general conditions shall be considered while developing material placement project scopes. Only allowable materials shall be used. No material shall be placed without direct onsite supervision by a representative of the County. No material shall be placed without obtaining any necessary inspection of material from regulatory agencies or their representatives. No material shall be placed without onsite GPS confirmation and a survey dive of the drop location immediately prior to placement. A buoy, clearly marking the deployment location will be maintained throughout deployment operations. These procedures will be used as the primary method to minimize any potential liability exposure to the County. The County Risk Manager shall also be consulted to assign necessary insurance coverage for contractors involved in reef construction. Placements shall be managed in accordance with the Material Placement Checklist (Sect. 8D).

### E. Project Frequency

The County attempts to build at least two projects per year. Priority shall be given to projects in zones without existing reefs or in sites in need of corrective action, subject to any permit limitations (see Table 1). Corrective projects will target areas with known user conflicts or crowding problems.

In addition, Lee County will assist any non-profit or private organization attempts to build reefs in Lee County waters. Lee County will ensure that the materials used are appropriate for the location, and are placed on a permitted reef site in accordance with all regulatory requirements with direct staff supervision.

### F. Grant Funded Projects

Grant funding shall be sought for at least one of the two annual projects. Private contributions shall be sought on all projects. Private contributions could include donation of materials, transportation, material preparation, and cash and in-kind contributions. When grant funds are used, any special conditions associated with the grant funding shall be incorporated into the project specifications used to select and choose a contractor. Every effort shall be made to provide recognition to reef donors and granting agencies.

## **5. ARTIFICIAL REEF MATERIALS**

Lee County has historically utilized a variety of materials in constructing its reefs. All materials utilized are in compliance with EPA standards and applicable permits. All materials used must show long term durability, stability, bio-fouling potential, and be readily available.

#### A. Material Criteria

Lee County may utilize any of the following materials:

- **concrete or steel vessels:** cleaned of all petroleum products, loose debris, etc. Inspected and approved by USCG;
- **concrete:** culverts, junction boxes, power poles, slabs, bridge rubble - all concrete must be clean, and lacking any potentially hazardous protrusions, such as rebar;
- **heavy gauge steel:** such as pipe or structural beams;
- **limestone rubble or natural rock;**
- **Structures specifically designed as artificial reefs:** provided all materials used in structures comply with guidelines of the Reef Plan.

All of the above material must demonstrate sufficient stability to remain in its' original deployment location in the event of a twenty year storm event. Lee County will utilize the Artificial Reef Stability Analysis Software v.0.1 provided by the FFWCC as a planning tool in judging a material's suitability for use at the planned deployment site.

Lee County will not utilize the following materials:

- vehicular tires;
- household or commercial appliances, i.e., "white goods";
- furniture, fiberglass boat molds, fiberglass vessels;
- any surface holding asphalt;
- any toxic or polluting material;
- wooden vessels.

#### B. Bio-fouling Potential of Material Types

The term bio-fouling relates to the process by which sessile, and/or anchoring organisms, attach to hard substrates. Numerous marine organisms, in their early life stages, drift with the ocean currents. Ultimately, they will settle out of the water column and attach onto an available hard surface. In Lee County waters, natural hard bottom is most often comprised of exposed limestone areas. Ideally, materials that mimic this habitat and provide the same or similar hard surface for attachment are the best materials for use as artificial reefs. Concrete fouls almost immediately in the marine environment. Barnacles colonize concrete often within the first week of immersion. Limestone rubble is also an excellent material for colonization. Its natural characteristics lend itself to the rapid and diverse growth shown on natural ledges. Steel material does show some bio-fouling potential, however, diversity and quantity of fouling organisms are less than concrete and limestone.

#### C. Prioritization of Material

Lee County's first priority in obtaining materials is suitability; second, is cost effectiveness. Concrete manufacturers often have surplus materials, such as culvert pipe or boxes. Disposing of this material can be very expensive for the manufacturer. If possible, the option of donating the material to the County offers a low cost, high benefit alternative. An added benefit of using these materials for the construction of an artificial reef, is the recycling benefit of using the discarded concrete pieces. Rather than filling the landfill with broken concrete, the material is reused and turned into long-term viable habitat. In addition, concrete is a very heavy, stable material that will not be relocated in storm events. Lee County has many local concrete manufacturers that offer a wide variety of heavy, pre-cast concrete materials. These "materials of opportunity" are the large majority of materials that Lee County utilizes.

With no large port nearby, large steel-hulled vessels have not been readily available to Lee County for use in its reef program. However, Lee County does have an interest in obtaining a large vessel as a high profile, major feature of its reef system, and is taking steps towards procuring one. Lee County has permitted a site in 115' of water primarily for this purpose. Occasionally, **steel barges** have been utilized as reef material. Other **heavy gauge steel**, such as pipe or crane superstructure and most recently, a large, cell phone tower, have been used to construct reefs in the past and, under certain circumstances, can be effective material.

## **6. SITE SELECTION CRITERIA**

### A. Site Selection Flowchart

Many of the benefits and potential pitfalls of artificial reef construction are directly related to site selection. History has also demonstrated how important site selection is for material compatibility. The Site Selection Flowchart (Figure 1) has been designed to provide a stepwise process for site selection. The steps will ensure that conflicts with existing fisheries uses are minimized and permitting criteria are met. The flowchart will be reviewed and updated as necessary to accommodate any permit conditions or concerns from the regulatory agencies.

### B. Selection Procedure

The flowchart indicates that in addition to written reference materials, such as charts and the Reef Plan, a minimum of four assessment dives will be conducted prior to permit application for all new sites. All dives will provide an assessment of the physical properties of the site. Several areas of Lee County nearshore waters have been found to have sediment too soft to support reef material. These areas will be avoided based on a hand or probe penetration standard. If it is found that the substrate is too soft, the remaining dives will be called off and a new site will be selected. Provided the sediment is conducive to reef deployment, subsequent dives will provide a preliminary assessment of any existing benthic communities, protected species and cultural resources that may exist on site. All dives will include a transect, or circular traverse of the area to be inspected on north, south, east and west compass headings for a minimum of 150' in each direction. Areas with extensive benthic communities or cultural resources may result in selection of a new site. If any protected species are observed during any assessment dive, a management plan may be developed to address their presence.

## **7. ARTIFICIAL REEF MANAGEMENT**

Artificial reef management covers a variety of areas. Maintenance of existing reef sites, monitoring of reef depositions, and education of reef users, are all-important considerations when managing an artificial reef program.

### **A. Maintenance**

An attempt is made to visit each reef site at least once a year to survey the reef material and monitor its performance. Determinations are made on each site concerning its success in meeting its intended objectives, material viability, use by recreational anglers and divers, and renourishment. Lee County marks some of its reef sites with buoys. Lee County has historically marked 8 of its nearshore reefs. This practice has been discontinued. This was done primarily for two reasons; the cost of maintenance was continuing to increase as these offshore buoys generally only lasted from 1-3 years, and the advent of easily affordable and accessible GPS units made the presence of the buoys virtually superfluous. Both of these factors were considered when determining that offshore buoys would no longer be maintained. The county will continue to maintain buoys at the Cape Haze reef in Charlotte Harbor as well as the Causeway reef, the newest of the County reefs.

### **B. Monitoring**

Each time the County visits a reef site, a survey is performed. This survey includes an inspection of the reef material to determine its physical status and condition. Also, an inventory of fish species is taken. A copy of the survey form is included in Appendix D. These surveys allow the County to track a particular reef's performance over time. They may help answer questions such as; what fish species prefer which material type, or what material appears to be the most suitable for benthic organism growth, and so on. It is important to track a reef's performance over time, as material longevity plays a key role in how productive a reef can be. In addition, underwater video will be taken during each survey. This video will be converted to a DVD format and stored with other video taken of each site for comparison over time.

As artificial reef structure becomes more complicated, and more time, money, and effort is put into constructing reefs, it behooves the County to determine the most effective methods of building reefs.

As stewards of the waters off Lee County's coast, it is also important ecologically to construct reefs that do not impact any pre-existing nearby natural live bottom, either directly or indirectly. Material moving off the permitted site due to storm events or other factors may directly impact nearby live bottom. Indirect impacts may include the "attraction" of resident fish species from a natural area to an artificial reef area. These types of impacts can be reduced, if not eliminated, by proper planning and building of artificial reefs. However, before the planning and building takes place, proper monitoring of existing materials and sites are vitally important. Having this information available can improve future reef development by optimizing site selection and material choice.

### **C. Education**

Lee County holds quarterly meetings with ARAC to discuss various issues concerning artificial reefs. The members of this committee come from a variety of user groups. These groups include recreational fishing clubs, professional fishing guides, SCUBA dive clubs, dive shops, and commercial fishermen. The committee is a conduit to the general public and special interest groups that are concerned with artificial reefs and their management. With the committee's assistance, Lee County is better able to make decisions regarding the planning and management of reefs, as well as the education of the public regarding different aspects of local reefs. Lee County also has a Waterway's Advisory Committee comprised of members from the local boating

community. This committee also is kept informed on the progress of any ongoing artificial reef projects and asked for input. A Lee County staff member is an active participant of the State Artificial Reef Advisory Board.

An open line of communication between the County and other local, state, and federal agencies that may be researching artificial reefs is an ongoing area of concern. The County stays up to date with newsletters and journals that deal with artificial reefs. Lee County will also attempt to attend and participate in any applicable reef meetings or conferences.

Lee County is addressing the issue of user conflicts on its reefs. A brochure has been developed that addresses proper reef “etiquette” as well as any legal statutes that focus on the use of artificial reefs. The brochure is available to the public upon request.

A Boaters Guide to Lee County waters is also available to local vessel operators. This guide, among other things, has a listing of most Lee County artificial reef sites, with GPS coordinates. Over 250,000 copies of this guide have been distributed to local visitors and roughly 28,000 registered vessel owners (2006) in Lee County. The guide is available upon request at many locations throughout the County. A web-enabled version of the guide is available on the County website. A printout listing the coordinates to each site is also available upon request from Lee County Natural Resources.

Lee County operates and maintains a website that offers a variety of information on artificial reefs. The Web address is <http://www.lee-county.com/naturalresources>.

All of the aforementioned educational materials are updated in a timely fashion and made available to the public.

## **8. PROJECT IMPLEMENTATION AND MANAGEMENT**

### **A. Material Acquisition**

Lee County’s first choice in materials is either heavy precast concrete or limestone rock. The advantages to concrete are its weight, size, rough texture, and ease of acquisition. There are many local manufacturers of precast concrete such as culvert, power poles and junction boxes. Often, these manufacturers will donate unwanted material to the County. This material may not meet manufacturing specifications, it may be cracked or broken, or simply be surplus material. Either way, concrete makes first class reef material. The availability of surplus concrete material far exceeds the demand and manufacturers would prefer to donate their surplus goods rather than dispose of them at the landfill due to obvious cost differences. Limestone rock is also an ideal material for obvious reasons. At one time in its history it comprised prehistoric reefs. Therefore, its reuse as reef material makes perfect sense. In recent years, a variety of pre-fabricated artificial reef materials have come on the market. Lee County has conducted monitoring of some of these types of materials by deploying concrete tetrahedrons and Reef Balls near similar piles of donated precast concrete. Continuing research at these sites may determine if purchasing prefabricated, designed reef materials is cost-effective and/or biologically superior to donated materials.

During project planning, Lee County will investigate possible sources and secure subsequent agreements with the donators for the use of their material. When possible, free materials may be adapted or modified to maximize their effectiveness.

### **B. Site Selection**

As described in Section 4, site selection will be based on a Site Selection Flowchart. Please refer to Flowchart for details. The basic criteria for site selection are seafloor type, depth of water, proximity to surrounding reefs and accessibility by boaters. A permit to place materials on the site is necessary from the ACOE and, if the site falls within state waters, FDEP. Information to be placed on the application includes, but is not limited to; Reef Site Bottom Survey Report with benthic conditions, Reef Site Chartlet describing locale, area coverage of reef site, reef material profile (maximum height of material off bottom), material description, and Uniform Waterway Marker Application for buoy placement, if applicable.

### C. Funding

An Artificial Reef Construction and Monitoring Grant Application is necessary to receive funding from the FFWCC. The Grant cycle begins with the application submittal date in March. The ending period for this cycle is June 30th, the following year. Pertinent information needed includes site location, project description, demand, and purpose. Included in the packet will be a chartlet showing the site and proximity to a recognized land based feature such as an island, Pass or marina, and a drawing of the proposed reef configuration.

Funding provided by the FFWCC is either through the U.S. Fish and Wildlife Federal Aid in Sport Fish Restoration program or the Florida saltwater fishing license revenues. Grants are awarded on a competitive basis without bias. Proposals are ranked by the information provided within the application. It is typically about eight months before grant awards are finalized and Project Agreements are signed. Lee County will adhere to Florida Statute 370.25 and F.A.C. Rule 68E-9 that are noted in the grant agreement.

The West Coast Inland Navigation District (WCIND) has also funded reef construction for Lee County. Reefs funded by the District typically are nearshore sites designed to reduce boating traffic in congested areas by giving boaters another destination within easy reach away from highly used traffic areas.

### D. Solicitation of Bids for the Construction of Artificial Reef

Pending appropriation of funds, Lee County Department of Public Works, Contracts Management, will create a formal bid packet and advertises for bids, if applicable. This packet describes the project scope and construction specifications. This packet also details insurance and liability issues. The time period between grant award, formulation of bid specifications, advertising and bid opening is approximately two to three months.

### E. Reef Construction

Concurrent with award of a Lee County Construction Contract, reef materials will be secured. Delivery of materials to the staging area will be coordinated between the County, the contractor, and material suppliers. The contractor will load the barge with the material to be deployed. The Lee County Project Manager will maintain an accurate count of the reef material tonnage that is loaded for transport to the permitted site, and ensure that all the material is placed within the reef site perimeter on the designated coordinates. No materials will be placed without onsite supervision by the County or their designee. A marker buoy will be placed prior to deployment and maintained throughout deployment operations to ensure that all material is placed within the permitted boundaries of the reef site. All placements will be immediately confirmed with GPS. The timeline on this schedule of events runs approximately two to four months.

### F. Contract Close-out/Site Inspection

Upon completion of construction, final construction documentation and County reimbursement paperwork must be completed. A final survey is performed to confirm proper placement of materials and obtain photo or video documentation if possible. Material Placement Reports will be provided as required.

## **9. PLAN GOALS**

- ◆ Continue to maintain and develop artificial reefs in Lee County waters, improving the existing sites and angling opportunities for the benefit of residents and visitors alike.
- ◆ Design reef projects to provide long-term habitat benefits and enhanced fishery productivity to the extent possible based on research findings and specific project objectives.
- ◆ Provide assistance to others who create properly constructed reefs in local waters.
- ◆ Coordinate with and assist any artificial reef activities conducted by other governmental agencies working in Lee County.
- ◆ Complete an Economic Impact Analysis of artificial reefs in Lee County. (To be completed in 2008)
- ◆ Continue the categorization and verification of existing materials, and the subsequent publishing of educational materials for the public benefit.
- ◆ Conduct at least two reef deposition projects per year.
- ◆ Continue applying for grant assistance from state and federal sources at least once per year.
- ◆ Maintain buoys at the following sites for the benefit of the boating public; Causeway and Cape Haze.
- ◆ Assure there are sufficient active federal and state (where applicable) permits for reef sites to meet the improvement needs for reefs shown in the Reef Site/Zone Summary Chart (see Table 1).
- ◆ Survey each reef site at least one time per year to monitor the site's material for durability, longevity, and effectiveness as productive habitat and consistency with stated objectives.
- ◆ Permit new reef sites in accordance with the Site Selection Flowchart (Figure 1), Zone Map (Appendix B), and Reef Site/ Zone Summary Chart (Table 1).
- ◆ Update this Reef Plan on an annual basis to incorporate new or changed conditions relative to reef construction.

## **APPENDIX A**

ACOE	United States Army Corps of Engineers
ARAC	Artificial Reef Advisory Committee: Lee County Environmental Services staff advisory committee providing comment and direction on artificial reef issues at monthly meetings.
BOCC	Lee County Board of County Commissioners
ERP	Environmental Resource Permit: joint application to ACOE, FDEP and other regulatory agencies as necessary to obtain authorization to construct an artificial reef.
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FFWCC	Florida Fish and Wildlife Conservation Commission
FMRI	Florida Marine Research Institute
GPS	Global Positioning System, satellite based navigation system to be used for reef material placement and site survey and selection.
USCG	United States Coast Guard
WAC	Waterways Advisory Committee: Lee County Board of County Commissioners advisory committee providing comment and direction on boating issues to BOCC and Lee County staff at monthly meetings.

**Table 1.** Summary of reef sites by planning zone.

Planning Zone	Active, Permitted Sites	Permit Expiration Date	Inactive, Unpermitted Sites	Improvement Needs	Comments
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<b>IA</b>	Cape Haze	DEP-5/7/02 ACOE-6/6/10		None	Allow Corps permit to lapse. DEP permit expired
			Danger	None	Leave unimproved
			Bokeelia	None	Leave unimproved
<b>NA</b>	Mary's	DEP-5/7/02 ACOE-6/6/10		None	DEP permit expired
<b>NB</b>	Helen's	DEP-5/7/02 ACOE-6/6/10		None	DEP permit expired
<b>NC</b>			Blind Pass Wreck		Leave unimproved
			Redfish Pass		Leave unimproved
<b>ND</b>			Belton Johnson	None	Site built out
<b>NE</b>	Causeway	ACOE-11/3/14 DEP-11/3/14		Bridge material	29 loads of causeway bridge rubble
			Sanibel		Large tractor tires
<b>NF</b>			MAY	None	Material added 2/99
<b>MA</b>	North County-line	DEP-N/A ACOE-2011		Add material	
<b>MB</b>			Power Pole	None	Within safety fairway
<b>MC</b>			Sherman's	None	
	Pace's	DEP-8/11/04 ACOE-11/24/09		None	Sunk 60' AV in 2004.
<b>MD</b>	Blanda's	DEP-11/11/06 ACOE-2011		Add material	Limestone rock
	Dean Hicks	DEP-pending ACOE-11/16/16		New site	
<b>ME</b>	Doc Kline	DEP-5/7/02 ACOE-11/24/09		None	DEP permit expired
			Edison	None	
<b>DA</b>			Boxcar		Potential renourish?
			School Bus	None	Within safety fairway
<b>DB</b>	Deep	ACOE-2011 DEP-N/A			For large vessel
			Charlie's	High profile material	Pegasus added 7/99
<b>DC</b>	ARC Barge	DEP-N/A ACOE-11/24/09		none	Material added in '03 and '04.
<b>JPA</b>				?	Consult w/Charlotte Co.
<b>JPB</b>			GH	None	
			Lee-Collier	?	Consult w/ Collier Co.
<b>JPC</b>				?	Consult w/ Collier Co.

## APPENDIX C

### MATERIAL PLACEMENT CHECKLIST.

TASK	DROP DEAD	DUE DATE	COMPLETED
Bids Received	-38		
Bid approval from FFWCC <sup>1</sup>	-36		
Recommendation of Award	-35		
BOCC approval of Contract	-21		
Contracts signed	-20		
Notice to Proceed	-19		
Notify FWC Ft. Myers <sup>2</sup>	-10		
Notify USCG Ft. Myers	-10		
Notify ACOE Ft. Myers	-10		
Flotation removed (vessels only)	-7		
Painted "Reef Material" (vessels only)	-7		
USCG-MSO inspection (vessels only)	-6		
Manifest of materials on board <sup>3</sup>	-1		
Barge leaves Port <sup>4</sup>	0		
Notify FWC Ft. Myers <sup>5</sup>	0		
Notify USCG Ft. Myers	0		
Notify ACOE Ft. Myers	0		
Deployment site confirmation <sup>6</sup>	0.5		
Material Placement <sup>7</sup>	1		
GPS Confirmation	1		
Material Placement Report to ACOE <sup>8</sup>	<30		
MPR copy to FFWCC	<30		
MPR copy to USFWS Vero Beach	<30		
MPR copy to NMFS Panama City	<30		
MPR copy to EPA Atlanta	<30		
MPR copy to ACOE Jacksonville	<30		
MPR copy to NOS, NOAA, Rockville, MD	<30		
Reimbursement Request Filed <sup>9</sup>	<30		

<sup>1</sup> Required on grant funded projects with only one bid.

<sup>2</sup> First notice must include point of departure, type of material, point of contact at departure site, and proof of ownership.

<sup>3</sup> Manifest includes itemized list of all reef materials.

<sup>4</sup> Daylight weekday departure only.

<sup>5</sup> Second notice must include time of departure, reef coordinates, permit number, estimated time of arrival at reef.

<sup>6</sup> Confirmation must include GPS position and pre-deployment SCUBA survey

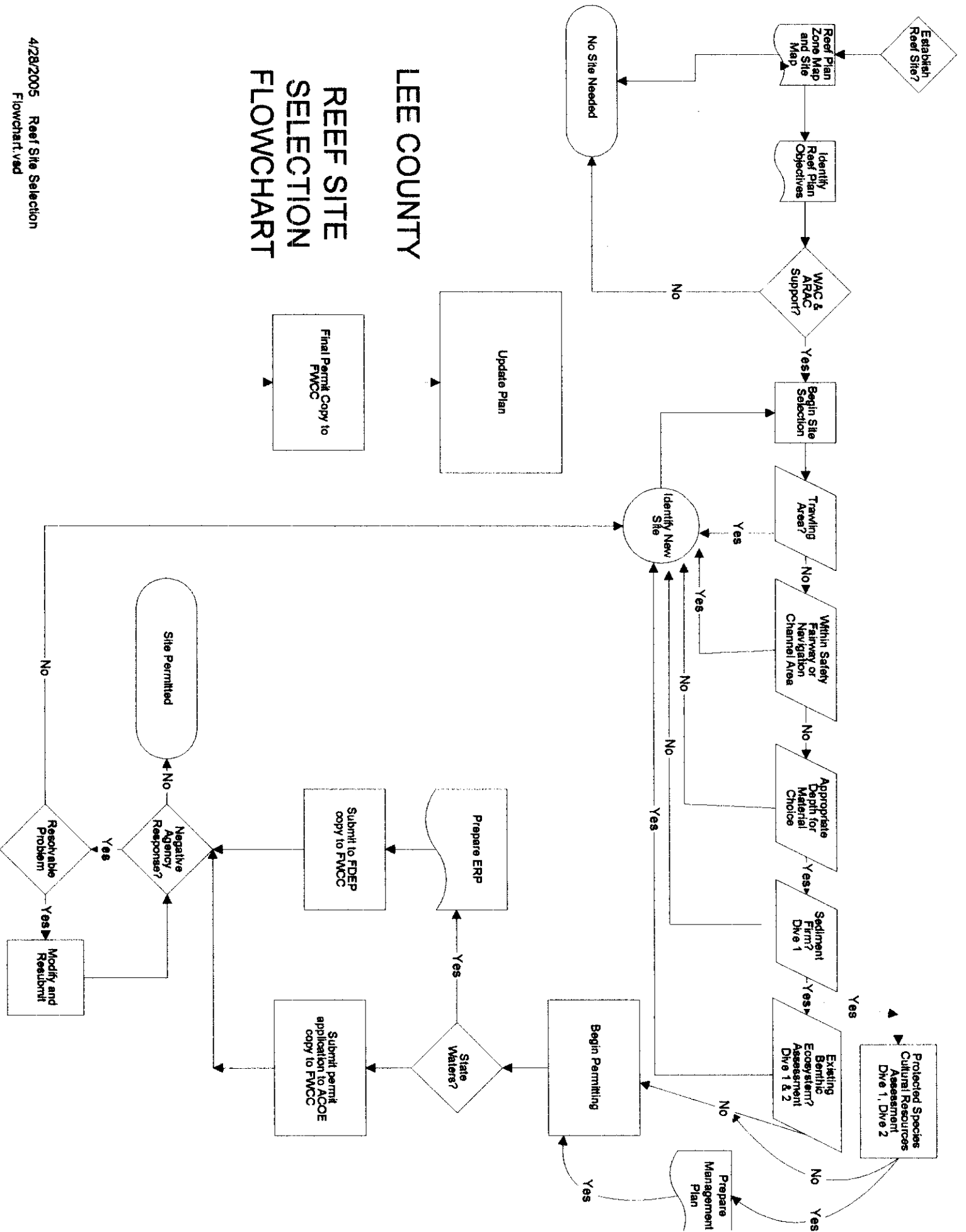
<sup>7</sup> June 30 for FFWCC funded projects.

<sup>8</sup> Material Placement Report (MPR) must include type and amount of material, cleaning method, placement location, configuration, and height after placement.

<sup>9</sup> Required on grant funded projects.



# LEE COUNTY REEF SITE SELECTION FLOWCHART



<b>Lee County Artificial Reef Deposition Schedule</b>												
Site	Zone	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	Total	Years since	Active Permits
											last deposition	
ARC Barge	DC	X	XX	X		XX	XX			10	1	Y
Belton Johnson	ND									3	7	N
Blanda's	MD			X	X		XX			4	1	Y
Boxcar	DA									3	12	N
Cape Haze	IA			X						2	3	N
Causeway								X	X	1**	0	Y
Charlie's	DB									2	7	N
Deep	DB									0		Y
Doc Kline	ME	XX								10	6	N
Edison	ME									1*	13	N
G-H	JPB									6	9	N
Helen's	NB		X							4	5	N
Mary's	NA	X								3	6	N
MAY	NF									3	7	N
North CL	MA				X				X	2	0	Y
Pace's Place	NC	XX	XXX				XX	X		8	0	Y
Power Pole	MB									3	13	N
School Bus	DA									2	8	N
Sherman's	MC									6	9	N
No Site	JPA									0		
Total		6	6	3	2	2	6	2	2	29		
*- 40 drops over two fiscal years												
**-29 drops over two fiscal years												
w/in safety fairway												
closed												